

FINANCIAL INCENTIVES TO SUPPORT CIRCULAR ECONOMY PRACTICES FOR ROMANIAN SMES: A COMPARATIVE ANALYSIS

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Abstract

The European Union is imposing increasing regulations on waste management, emission reduction, and resource efficiency. SMEs (small and medium-sized enterprises) that embrace the circular economy early will be better equipped to comply with these rules and avoid penalties or barriers to accessing European markets. Our study compares the circular economy practices of Romanian small and medium-sized enterprises with those of the European Union. The main findings indicate that Romanian SMEs are in the early stages compared to their EU counterparts, where the circular economy is already an integral part of business strategies. Additionally, we focus on the financial incentives that decision-makers provide to SMEs that implement circular economy practices. The primary emphasis of our study is on comparative data analysis between Romania and EU nations to identify the best models and learn from them. The findings reveal significant heterogeneity of circular economy policies among EU nations. Furthermore, Romania lags behind most examined countries in offering financial incentives to encourage SMES to adopt circular economy practices. Given that the enterprises analysed are SMEs, the sector in which these circular economy measures are most needed for improvement, we consider our findings to have substantial implications for the development of regulatory frameworks in Romania on this issue.

Keywords: *SMEs, circular economy, financial incentives, comparative analysis*

JEL Classification: L21

1. INTRODUCTION

The circular economy (CE) is a substitute for the traditional linear economy, which seeks to prolong the life cycle of products and materials through strategies such as sharing, leasing, reuse, recycling, remanufacturing, and sustainable design

(Geissdoerfer *et al.*, 2017; European Parliament, 2023). Due to their agility and innovation potential, SMEs play a critical role in implementing Circular economy practices at local and regional levels.

However, SMEs often face specific challenges, generated by both internal and external barriers (e.g. limited financial, human, and technological resources, risk aversion, legislative barriers), when transitioning toward circular models (Rizos *et al.*, 2016; Kirchherr *et al.*, 2018; Takacs *et al.*, 2022).

Although a growing body of research exists on the circular economy, the literature remains relatively fragmented in its specific analysis of financial incentives for SMEs. Most studies focus on large industries or general regulations, without providing sufficient empirical data on the concrete impact of incentive policies on SMEs during the ecological transition (Kirchherr *et al.*, 2018). Therefore, in-depth research is necessary to investigate the typology of effective incentives, the barriers faced by SMEs, and how these can be integrated into a coherent and sustainable policy framework.

In relation to previous aspects, the main objective of this paper is to identify the financial incentives available to Romanian SMEs adopting circular economy practices. We conduct this analysis after first attempting to ascertain the position of Romanian SMEs in implementing these practices compared to their counterparts in the European Union. Therefore, this paper has a largely descriptive role with some emphasis on comparisons between Romania and the European Union.

To achieve the paper's objectives, we begin by conducting a brief literature review, summarising the main findings from the literature regarding CE practices in SMEs. Next, we describe the methodology employed. Following that, we present the key results and discuss them. We conclude the paper with final remarks.

2. THEORETICAL BACKGROUND

The adoption of circular economy practices by SMEs may lead to superior environmental performance through increased energy and resource efficiency, as well as reduced waste (Dey *et al.*, 2002). In the literature, it has been shown that the most common CE practices among SMEs are waste reduction and recycling (Bassi and Dias, 2019; Sharma *et al.*, 2021), use of sustainable raw materials (Barón *et al.*, 2020) and Product-as-a-Service (PaaS) models and leasing (Linder and Williander, 2017; Vetrova and Ivanova, 2025; Ingle *et al.*, 2025).

A significant number of studies have discussed the barriers identified by firms in adopting circular economy practices, highlighting financial constraints and the lack of essential financial resources as key obstacles to their adoption (Demirel and Denisman, 2019; García-Quevedo *et al.*, 2020; Sartal *et al.*, 2020; De La Cuesta-González and Morales-García, 2022). However, the perception of barriers varies significantly depending on the types of activities implemented within the company. Firms that redesign the goods and services they provide to

minimise material usage perceive more barriers as important. In contrast, firms that implement activities related to waste reduction, energy consumption planning to minimise usage, and renewable energy adoption consider aspects related to administrative procedures and regulations as obstacles (García-Quevedo *et al.* 2020).

Financial incentives are recognised in the literature as a key factor in facilitating the smooth operation of SMEs' activities. These can take various forms: direct subsidies, low-interest loans, tax incentives, or public-private financing schemes (European Commission, 2020). However, Rizos *et al.* (2016) note that such programmes are often underutilised by SMEs due to administrative complexity and a lack of awareness.

Studies show that, especially for SMEs, financial support is decisive in the initial transition phase to circular economy, when implementation costs are perceived as high (Ghisellini *et al.*, 2016).

Recent literature highlights a diversity of approaches at national and regional levels regarding financial incentives. For example, Horizon Europe and the Structural Funds provide significant resources for eco-innovation in SMEs (European Investment Bank, 2022). However, the effectiveness of these instruments largely depends on the ability of SMEs to access and manage the funds, as well as on the alignment of economic policies with sustainability objectives (Caldera *et al.*, 2022). Bassi and Dias (2019) also emphasised that the business incentives and motivations to advance the transition towards a CE model may differ considerably, both qualitatively and quantitatively, depending on the sector, the company, and its geographical location.

Venture capital, private equity, green bonds, and sustainability-linked loans are emerging as significant instruments for circular economy practices. Several studies (Bocken *et al.*, 2016; Lüdeke-Freund *et al.*, 2019) indicate that investors are increasingly interested in circular economy innovations, particularly in sectors such as renewable materials and sharing platforms. The European Investment Bank provides financing opportunities for various circular economy projects and has a specific financing instrument aimed at SMEs in collaboration with local banks and other financial intermediaries (EIB, 2023). Additionally, alternative tools such as green leasing, product-as-a-service models, and crowdfunding are highlighted in recent case studies (Kalmykova *et al.*, 2018). A study conducted by Ghisetti and Montresor (2020) emphasised that inadequate access to finance is a significant obstacle to the adoption of circular economy practices, particularly for SMEs. The research suggests that addressing these financial barriers is crucial for promoting the widespread implementation of CE activities.

Analysing the types of financing sources targeting CE activities, it was observed that the traditional forms (debt and grants) have no or negative impact on the growth of SMEs, while equity finance (such as angel and venture capital investments) contributes positively to their development (Demirel and Denisman,

2019). Moreover, a study of Scarpellini *et al.* (2021) highlights that public subsidies are crucial for promoting renewable self-consumption and energy efficiency within the circular economy framework. The paper indicates that such financial support can mitigate investment risks and enhance the financial feasibility of circular economy projects.

3. METHODOLOGY

To achieve the purpose of this paper, we first considered analysing the data provided by the European Commission through reports on circular economy practices in SMEs from Romania. By analysing reports from several years, we formulate a series of conclusions regarding their evolution. Using graphic representations and the comparison method, we compare SMEs from Romania to those from the EU to highlight the gaps.

The next step was to search, list and analyse in detail the main financial incentives that SMEs from Romania can benefit from to stimulate them in implementing circular economy practices.

4. RESULTS AND DISCUSSIONS

4.1. Overview of the circular economy actions in SMEs

In 2015, 12.15% of EU firms did not undertake any substantive action to become more resource-efficient (European Commission, 2016), whereas in 2021, the percentage of inactive firms had decreased to 7.35% (European Commission, 2022). In 2015, 51.98% of European SMEs implemented between one and four actions, while 35.87% pursued more measures. Additionally, in 2021, 50.49% of these firms undertook between one and four actions, and the remaining 42.16% engaged in more than four actions.

In summary, 87.35% of SMEs took at least one of the CE actions in 2015, while in 2021, the active firms in the CE transition increased to 89% (European Commission, 2016; European Commission, 2022).

Compared to the evolutions from previous years, in 2024, most of the SMEs included in the survey declare that they are undertaking a range of resource efficiency measures. Therefore, 42% of SMEs from the European Union reported that they are undertaking five or more of the resource efficiency actions mentioned in the survey, 31% are undertaking three or four actions and 20% one or two actions; the remaining 6% of EU SMEs are not taking any action (European Commission, 2024). These comparative evolutions are presented in Figure 1.

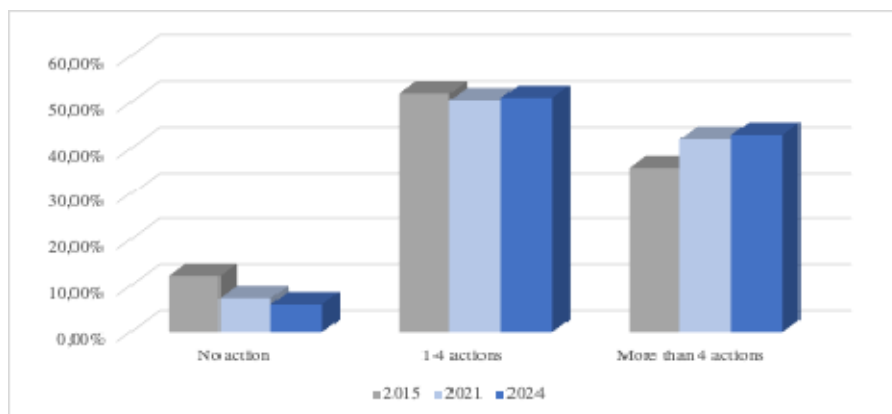


Figure 1. Number of CE actions taken by EU SMEs

Source: (authors' elaboration after data from European Commission (2016), European Commission (2022) and European Commission (2024))

These results show that CE actions are persistent over time, so that SMEs involved make the initial physical investments and the experiences accumulated in the CE management profitable.

Analysing the situation for Romania, the reports of the European Commission (European Commission, 2024) show that it is among the countries with the largest number of SMEs that do not take any action to be more resource efficient: Romania (16%), Estonia and Hungary (16%), Slovenia (18%) and Latvia (25). Another peculiarity is that in Romania (as well as in Latvia, Hungary and Sweden) a decrease in all measures adopted by SMEs was registered in 2024.

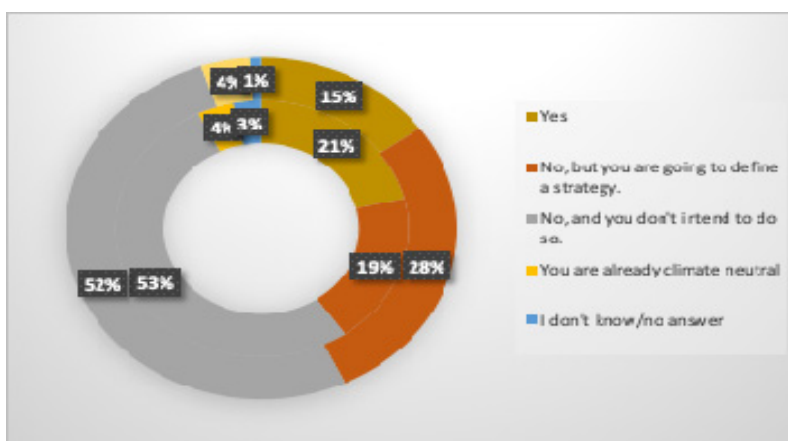


Figure 2. Strategies to reduce carbon footprint (% of SMEs)

Note: the external circle is for Romania, the internal circle is for the EU.

Source: (authors' elaboration after data from European Commission (2024))

When asked if their company has a concrete strategy to reduce its carbon footprint and become climate neutral or negative, 15% of SMEs from Romania said yes, compared to 21% of SMEs from the European Union. 28% of SMEs said they do not have a strategy, but they intend to define one. The highest share, 52% of SMEs in Romania, answered that they do not have a strategy and they do not intend to define one (see figure 2).

Therefore, the circular activities applied by the SMEs from Romania are still modest, as they also were a couple of years ago (Oncioiu *et al.*, 2018).

Regarding the financial side, the largest share of SMEs saying they rely on their own financial resources in becoming more resource efficient is obtained in Romania (86%). High shares are also registered for Austria (80%), Estonia, Greece and Slovakia (78%). In France, on the other hand, less than half of SMEs (42%) rely on their own financial resources. Furthermore, compared to 2021, there was a 6% decrease in the proportion of SMEs relying on external support to be more resource efficient (reaching 8%). These results highlight the need, in Romania, for targeted financial incentives to help SMEs adopt circular economy processes.

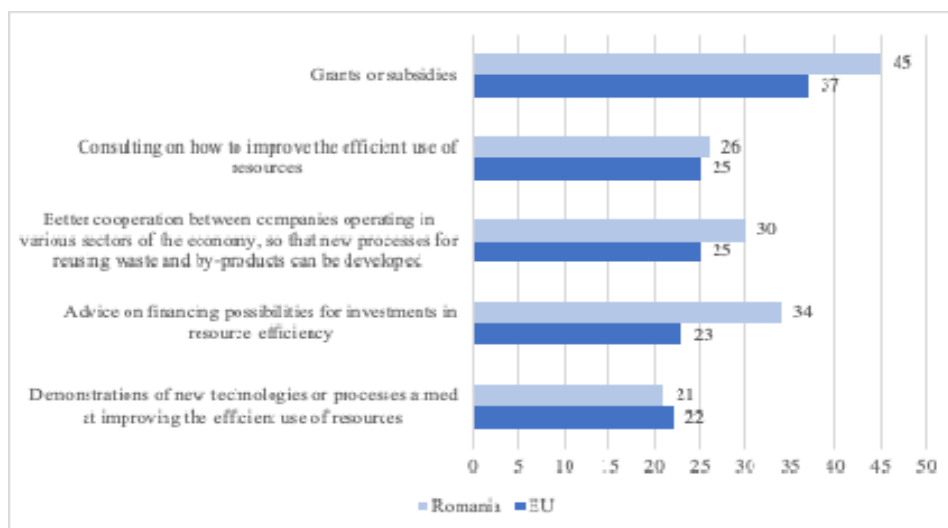


Figure 3. What instruments would most help the company in using resources more efficiently? (% of SMEs)

Source: (authors' elaboration after data from European Commission (2024))

Flash Eurobarometer 549 (European Commission, 2024) also focused on identifying which instruments would most help the SMEs use resources more efficiently. The top five answers to this question, in the case of Romania, showed that, almost half of SMEs mentioned grants and subsidies as instruments that

would help them (45%), followed by consultancy on financing possibilities available to SMEs to be invested in resource efficiency practices (34%), and better collaboration between companies from various sectors of activity (30%) (see figure 3).

In response to the question, what type of support would help you most to expand your range of green products or services? Half of the SMEs interviewed mentioned that financial incentives would help them in the development of new products, services or production processes. In second place as importance are marketing or distribution consulting services (mentioned by 39% of SMEs), and in third place are technical assistance or consulting in how to obtain new products, services or production processes (mentioned by 35% of SMEs) (see figure 4).

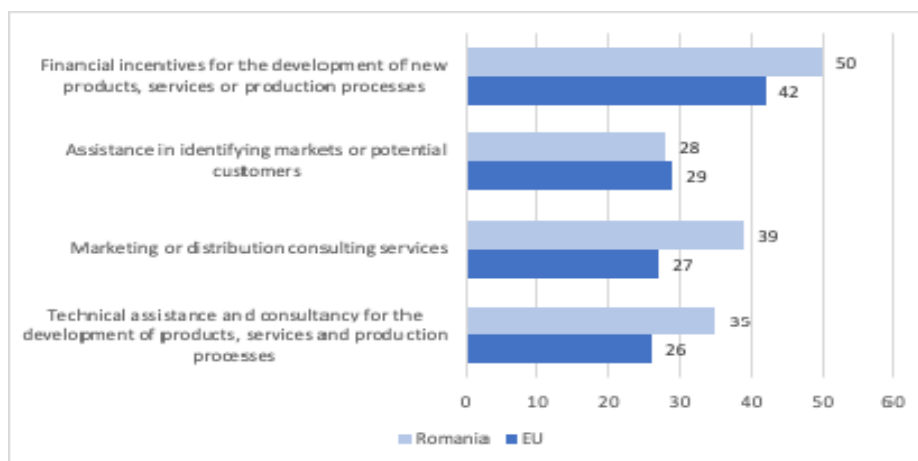


Figure 4. What type of support would help you most to expand your range of green products or services? (% of SMEs)

Source: (authors' elaboration after data from European Commission (2024))

These results show the significant role played by financial incentives in supporting SMEs in Romania in adopting circular economy practices. The transition to a green economy involves a profound change in the way companies operate, develop products and use their resources. However, these transformations involve significant costs, high initial risks and, often, a long payback period. In this context, financial incentives become a vital mechanism to accelerate the adoption of sustainable practices and encourage green innovation.

The results obtained above also highlight the vital need for consultancy related to the financing possibilities of these practices, as well as the efficient use of resources obtained within companies to expand the range of green products and services. Thus, specialised consultancy becomes a vital strategic resource, which allows companies to navigate in a complex, constantly changing environment. Access to green financing sources (grants, EU funds, sustainable lending

instruments, public-private partnerships, etc.) requires a deep understanding of the eligibility criteria, application procedures, and the national and European legislative framework. Companies that lack expertise in these areas risk losing valuable opportunities or not making the most of the available instruments. The efficient use of attracted financial resources is essential to ensure the real and sustainable impact of investments in green products and services. In the absence of a clear strategic plan, adapted to the company's sustainability objectives, there is a risk of inefficient allocation, fragmentation of efforts and even failure to achieve expected results. Through consulting, companies can develop sustainable financial and operational management mechanisms, relevant performance indicators and business models aligned with the requirements of the green market.

4.2. Brief review of the financial incentives available in Romania for SMEs and the main barriers in accessing them

In Romania, financial incentives for SMEs that adopt circular economy practices are diverse and come from several sources, including European funds, national programs and fiscal policies. In the following, we describe the main sources:

a. InvestEU Sustainability Guarantee

The European Investment Fund (EIF), in collaboration with Romanian banks, offers guarantees of around 500 million euros under the InvestEU Member State Compartment. This initiative aims to facilitate up to €700 million in financing for SMEs pursuing sustainable and circular economy projects. The participating banks are UniCredit Bank, Alpha Bank, Libra Internet Bank, BRD Groupe Société Générale, Patria Bank, Intesa Sanpaolo Bank, and Garanti BBVA. The guarantees enable these banks to provide improved financing terms, such as lower interest rates, reduced collateral requirements, and extended loan maturities, thereby enhancing access to finance for SMEs engaged in green and sustainable transformations (European Investment Fund, 2024).

The obstacles that SMEs may encounter in accessing this programme are due to the fact that, despite guarantees covering up to 80% of the loan value, SMEs must ensure their own contribution of at least 20%. For smaller SMEs, this requirement can pose a significant barrier, particularly in the context of limited financial resources. Furthermore, to benefit from the programme, SMEs must collaborate with partner financial institutions designated by the European Investment Fund. The availability of these partners and SMEs' familiarity with their procedures may differ, potentially making access to finance more challenging.

b. Regional Operational Programme (ROP) 2021–2027

This programme allocates substantial funds to support SME investments in various regions of Romania. It supports the implementation of the circular economy in SMEs through a series of specific measures, adapted to the regional and sectoral context. These measures aim to integrate circular economy principles into production processes, promote resource efficiency and reduce environmental impact.

The Regional Operational Programme provides for a series of specific measures to support the circular economy until 2027. These include: (i) investments in green and efficient technologies. SMEs can benefit from funding for: acquisition of equipment and technologies that support product design for durability, reparability and recyclability, implementation of solutions for the recovery and reuse of raw materials, materials and products, adoption of technologies for reducing greenhouse gas emissions and for producing energy with low carbon dioxide emissions; (ii) support for industrial symbiosis and the use of secondary materials. Funding is provided for: creation of industrial symbiosis networks, where waste or by-products of one enterprise become resources for another, and use of surpluses or secondary materials in the production processes of SMEs; (iii) developing skills in the field of circular economy by supporting professional training activities for employees, including: retraining and specialisation courses in the field of circular economy and developing technical and management skills necessary to implement circular solutions; (iv) support for research and innovation in the field of circular economy. SMEs can benefit from funding for developing new products and processes that integrate the principles of the circular economy and collaborations with research-development-innovation organisations to implement innovative solutions (Ministerul Investițiilor și Proiectelor Europene, 2021).

Although the amounts offered through this program could stimulate SMEs to increase the use of circular economy practices, a series of obstacles can also be mentioned: small SMEs do not dare to compete with larger companies, budgets per calls are limited so that only a part of those who apply obtain the funds, and the co-financing condition. SMEs must have their own contribution (co-financing) between 10 and 30%, which can represent a significant obstacle for micro and small companies.

c. De Minimis Aid Schemes

The Romanian government continues to implement de minimis aid schemes to support SMEs in various sectors, including those adopting circular economy practices. These schemes typically offer financial assistance covering up to 50% of eligible expenses for investments in green technologies, waste management systems, and energy efficiency improvements. The specific programs and their

details are announced periodically through official channels such as the Ministry of Finance and the Ministry of Economy.

d. State Aid for the Manufacturing Industry

The Romanian government has allocated 150 million euros in state aid for the manufacturing industry. This funding aims to support investments in sustainable manufacturing practices, including the adoption of circular economy principles. It has the following schemes: the state aid scheme for strategic investments in the manufacturing industry (2025–2030), the state aid scheme for the decarbonisation of industrial processes (2025–2030), the state aid scheme for small industrialists (2025–2030) and the state aid scheme for investments in biofuel production capacity (2024–2025).

These state aid schemes offer significant opportunities for SMEs in Romania that want to invest in sustainable technologies and processes. To benefit from these funds, projects must align with the decarbonisation and circular economy objectives, comply with the eligibility criteria, and are implemented within the established deadlines.

However, SMEs face challenges in accessing these state aid schemes. Many of the schemes focus on large-scale projects (e.g. investments of over EUR 150 million), making them unavailable to most SMEs. Additionally, SMEs may struggle to demonstrate the economic and environmental impact of the project, their capacity for co-financing, financial sustainability, and previous experience in circular economy projects. Although a significant portion of the project is covered by state aid (50–85%), SMEs must secure the remainder from their own resources or loans. Furthermore, SMEs are required to prove the availability of funds before approval.

Financial incentives are not only beneficial but essential for catalysing a functioning green economy. They allow companies to innovate, grow sustainably and actively contribute to protecting the environment and ensuring a sustainable future for society. But, although several programs and funding lines have been launched in recent years to support the green transition, SMEs in Romania face a series of systemic and operational obstacles that limit their effective access to these resources.

One such obstacle comes from the fact that information is often dispersed, difficult to understand and does not reach small entrepreneurs efficiently. Similar results were obtained by OECD (2021). SMEs, especially those in rural or non-technological areas, do not have easy access to sources of information on available grants or subsidies. Moreover, many companies do not understand the eligibility criteria or do not have the ability to quickly analyse the opportunity for financing in relation to their own business model. Other companies face a lack of specialised internal resources (development or funding departments), which makes them dependent on external consultancy, which is not always financially accessible.

Also, most of the time, the documentation required is extensive, technical and time-consuming, which is a major challenge for SMEs with limited staff. The fact that they do not have employees who are specialised in green transition reduces the number of resource-efficiency measures but also influences the number of actions that the SME was planning for the future (de Andrade *et al.*, 2025; Bassi and Dias, 2020; Yadav *et al.*, 2018).

Another major obstacle comes from the fact that sometimes guarantees, or co-financing are required that SMEs cannot support, especially in unstable economic contexts.

Selection and evaluation procedures can be slow, non-transparent and unpredictable, discouraging participation in competitive calls. Moreover, SMEs need stability to plan medium and long-term investments. However, in Romania, many funding programs are launched sporadically, with short deadlines and without a clear calendar, which affects strategic planning.

Legislative changes or criteria changed between calls represent another obstacle to SMEs accessing financial incentives and create uncertainty and a lack of trust in the public support mechanism.

On the other hand, for SMEs that manage to obtain funding; after obtaining it, they often face difficulties in effectively implementing the projects, due to a lack of qualified staff or inadequate internal procedures. Moreover, monitoring, auditing and reporting requirements can exceed the administrative capacity of a small company, putting pressure on existing resources.

SMEs in urban areas or developed regions generally have more access to support infrastructure, networks of consultants and information, while firms in rural or underdeveloped areas are more isolated and less competitive in attracting funds.

5. CONCLUSIONS

The main objective of our study was to analyse the circular economy practices employed by SMEs in Romania, compared to those in the European Union. We also aimed to highlight the financial incentives available to support SMEs in making the green transition. To achieve these objectives, we examined the data provided by European Commission reports and concluded that SMEs in Romania are lagging other member states of the European Union in terms of the green transition.

We also identified the main financial incentives available to SMEs in Romania focused on the circular economy, and we identified the main obstacles that arise in accessing them.

Therefore, the main conclusion of our study is that although some financial support programmes for companies have emerged in recent years with the aim of applying circular economy practices, many obstacles hinder SMEs from accessing them. Consequently, there is a need for increased information about their

availability, as well as consultancy services both for accessing these programmes and for using the funds after obtaining them.

Both literature and our findings indicate that, although various financing sources are available to SMEs for circular economy activities, challenges such as limited access to information, complex application procedures, and a lack of awareness hinder their effective utilisation. Addressing these barriers through targeted policies and support mechanisms is crucial to facilitate the transition towards a circular economy.

This is an initial study on this topic, driven by our research interests in this issue. In future research, we aim to expand this analysis by applying econometric methods to assess the impact of incentives and financial aid on the number of circular economy practices adopted by SMEs. Naturally, this will also rely on the availability of data.

References

- 1) Barón, A., de Castro, R., and Giménez, G. (2020). Circular economy practices among industrial EMAS-registered SMEs in Spain. *Sustainability*, 12(21), 9011.
- 2) Bassi, F., and Dias, J. G. (2019). The use of circular economy practices in SMEs across the EU. *Resources, Conservation and Recycling*, 146, 523-533.
- 3) Bassi, F., and Dias, J. G. (2020). Sustainable development of small-and medium-sized enterprises in the European Union: A taxonomy of circular economy practices. *Business strategy and the environment*, 29(6), 2528-2541.
- 4) Bocken, N. M., De Pauw, I., Bakker, C., and Van Der Grinten, B. (2016). Product design and business model strategies for a circular economy. *Journal of industrial and production engineering*, 33(5), 308-320.
- 5) Caldera, S., Hayes, S., Dawes, L., and Desha, C. (2022). Moving beyond business as usual toward regenerative business practice in small and medium-sized enterprises. *Frontiers in Sustainability*, 3, 799359.
- 6) de Andrade, R. D., Benfica, V. C., de Oliveira, H. V. E., & Suchek, N. (2025). Investigating green jobs and sustainability in SMEs: Beyond business operations. *Journal of Cleaner Production*, 486, 144477.
- 7) De La Cuesta-González, M., & Morales-García, M. (2022). Does finance as usual work for circular economy transition? A financiers and SMEs qualitative approach. *Journal of Environmental Planning and Management*, 65(13), 2468-2489.
- 8) Demirel, P., and Danisman, G. O. (2019). Eco-innovation and firm growth in the circular economy: Evidence from European small-and medium-sized enterprises. *Business Strategy and the Environment*, 28(8), 1608-1618.
- 9) Dey, P. K., Malesios, C., Chowdhury, S., Saha, K., Budhwar, P., and De, D. (2022). Adoption of circular economy practices in small and medium-sized enterprises: Evidence from Europe. *International Journal of Production Economics*, 248, 108496.
- 10) European Commission (2016). *Flash Eurobarometer 441. European SMEs and the circular economy – Report*, Publications Office, Directorate-General for Environment and TNS Political & Social. Available at: <https://data.europa.eu/doi/10.2779/397947> [Accessed 30.05.2025].

- 11) European Commission (2020). Funding opportunities for small businesses. Available at: https://commission.europa.eu/funding-tenders/how-apply/eligibility-who-can-get-funding/funding-opportunities-small-businesses_en [Accessed 30.05.2025].
- 12) European Commission (2022). *Flash Eurobarometer 498. SMEs, green market and resource efficiency*. Available at: <https://europa.eu/eurobarometer/surveys/detail/2287> [Accessed 4.06.2025].
- 13) European Commission. (2024). *Flash Eurobarometer 549. SMEs, green market and resource efficiency*. Available at: <https://europa.eu/eurobarometer/surveys/detail/3221> [Accessed 4.06.2025].
- 14) European Investment Bank (EIB). (2022). The innovation response. Activity Report 2021. Available at: https://www.eib.org/files/publications/eib_activity_report_2021_en.pdf [Accessed 3.06.2025].
- 15) European Investment Bank (EIB). (2023). The EIB Circular Economy Guide. Supporting the circular transition. Available at: https://www.eib.org/attachments/lucalli/20230140_the_eib_circular_economy_guide_en.pdf [Accessed 4.06.2025].
- 16) European Investment Fund. (2024). Romanian banks to get an additional €500 million in financing under new EIF guarantee agreements. Available at: <https://www.eif.org/InvestEU/news/2024/romanian-banks-to-get-an-additional-eur500-million-in-financing-under-new-eif-guarantee-agreements.htm> [Accessed 30.05.2025].
- 17) European Parliament (2023). Circular economy: definition, importance and benefits. [online]. Available at: <https://www.europarl.europa.eu/topics/en/article/20151201STO05603/circular-economy-definition-importance-and-benefits> [Accessed 23.05.2025].
- 18) García-Quevedo, J., Jové-Llopis, E., and Martínez-Ros, E. (2020). Barriers to the circular economy in European small and medium-sized firms. *Business strategy and the environment*, 29(6), 2450-2464.
- 19) Geissdoerfer, M., Savaget, P., Bocken, N. M., and Hultink, E. J. (2017). The Circular Economy—A new sustainability paradigm? *Journal of Cleaner Production*, 143, 757-768.
- 20) Ghisellini, P., Cialani, C., & Ulgiati, S. (2016). A review on circular economy: the expected transition to a balanced interplay of environmental and economic systems. *Journal of Cleaner production*, 114, 11-32.
- 21) Ghisetti, C., & Montresor, S. (2020). On the adoption of circular economy practices by small and medium-size enterprises (SMEs): does “financing-as-usual” still matter? *Journal of Evolutionary Economics*, 30(2), 559-586.
- 22) Ingle, M., Khati, K., and Dahiya, K. (2025). The Rise of Product-as-a-Service Models in the Digital Era: Redesigning Business Models for Circular Innovation. In *Innovating Sustainability Through Digital Circular Economy* (pp. 107-132). IGI Global Scientific Publishing.
- 23) Kalmykova, Y., Sadagopan, M., and Rosado, L. (2018). Circular economy—From review of theories and practices to development of implementation tools. *Resources, conservation and recycling*, 135, 190-201.

- 24) Kirchherr, J., Piscicelli, L., Bour, R., Kostense-Smit, E., Muller, J., Huibrechtse-Truijens, A., and Hekkert, M. (2018). Barriers to the circular economy: Evidence from the European Union (EU). *Ecological economics*, 150, 264-272.
- 25) Linder, M., and Williander, M. (2017). Circular business model innovation: inherent uncertainties. *Business strategy and the environment*, 26(2), 182-196.
- 26) Lüdeke-Freund, F., Gold, S., and Bocken, N. M. (2019). A review and typology of circular economy business model patterns. *Journal of industrial ecology*, 23(1), 36-61.
- 27) Ministerul Investițiilor și Proiectelor Europene (2021). Programe Regionale 2021-2027. Available at: <https://mfe.gov.ro/programe-regionale-21-27/> [Accessed 30.05.2025].
- 28) OECD (2021). No net zero without SMEs: Exploring the key issues for greening SMEs and green entrepreneurship. OECD SME and entrepreneurship papers no. 30. Available at: https://www.oecd.org/content/dam/oecd/en/publications/reports/2021/11/no-net-zero-without-smes_4780309d/bab63915-en.pdf [Accessed 10.06.2025].
- 29) Oncioiu, I., Căpușeanu, S., Türkeş, M. C., Topor, D. I., Constantin, D.-M. O., Marin-Pantelescu, A., & Ștefan Hint, M. (2018). The Sustainability of Romanian SMEs and Their Involvement in the Circular Economy. *Sustainability*, 10(8), 2761.
- 30) Rizos, V., Behrens, A., Van der Gaast, W., Hofman, E., Ioannou, A., Kafyeke, T., Flamos, A., Rinaldi, R., Papadelis, S., Hirschnitz-Garbers, M., and Topi, C. (2016). Implementation of circular economy business models by small and medium-sized enterprises (SMEs): Barriers and enablers. *Sustainability*, 8(11), 1212.
- 31) Sartal, A., Ozcelik, N., and Rodriguez, M. (2020). Bringing the circular economy closer to small and medium enterprises: Improving water circularity without damaging plant productivity. *Journal of Cleaner Production*, 256, 120363.
- 32) Scarpellini, S., Gimeno, J. Á., Portillo-Tarragona, P., & Llera-Sastresa, E. (2021). Financial resources for the investments in renewable self-consumption in a circular economy framework. *Sustainability*, 13(12), 6838.
- 33) Sharma, N. K., Govindan, K., Lai, K. K., Chen, W. K., and Kumar, V. (2021). The transition from linear economy to circular economy for sustainability among SMEs: A study on prospects, impediments, and prerequisites. *Business Strategy and the Environment*, 30(4), 1803-1822.
- 34) Takacs, F., Brunner, D., and Frankenberger, K. (2022). Barriers to a circular economy in small-and medium-sized enterprises and their integration in a sustainable strategic management framework. *Journal of Cleaner Production*, 362, 132227.
- 35) Vetrova, M. A., and Ivanova, D. V. (2025). "Product as a Service" Business Model in the Context of the Development of a Digital Circular Economy: The Transition to a Circular Economy. In *Multidisciplinary Analysis of Digital Transformation and Global Market Dynamics* (pp. 1-24). IGI Global.
- 36) Yadav, N., Gupta, K., Rani, L., & Rawat, D. (2018). Drivers of sustainability practices and SMEs: A systematic literature review. *European Journal of Sustainable Development*, 7(4), 531-531.